THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XIV DECEMBER, 1941 No. 10

A. S. M. FORMS WAR PRODUCTS COMMITTEES

Welding Experts at Joint Chapter Meeting

At Worcester Chapter Welding Night (Left to Right) Joseph G. Magrath of Air Reduction Sales Co., Chief Speaker; Charles H. E. Coster, Head of the Welding Department, Worcester Boys Trade School, Technical Chairman; Robert I. Belmont, Superintendent of L. Hardy Co., Chapter Chairman; John C. Kasabula, Welding Instructor, Worcester Boys Trade School; and Walter A. Ovaska, of Air Reduction Sales Co.

A.S.T.E. Joins A.S.M. for Welding Night at Worcester

Reported by John R. Dobie
Heat Treat Foreman, American Steel & Wire Co.

Worcester Chapter — "Welding Night" on Nov. 5 in Sanford Riley Hall, Worcester Polytechnic Institute, was held jointly with the Worcester Chapter of the American Society of Tool Engineers.

Chief speaker was Joseph G. Magrath of the applied engineering department, Air Reduction Sales Co., who spoke on "Oxy-Acetylene Surface Treatment of Steel".

Other speakers were Walter A. Ovaska, supervisor of applied engineering department, Air Reduction Sales Co.; Charles H. E. Coster, head of the welding department, Worcester Boys Trade School; Robert I. Belmont, superintendent of L. Hardy Co., A.S.M. Chapter chairman; C. J. Lindegren, of Crompton & Knowles Loom Works, chairman of Worcester Chapter, American Society of Tool Engineers; and L. A. Morris, national vice-chairman of the A.S.T.E.

Assisting in the evening's arrangements were John C. Kasabula of Worcester Boys Trade School, J. Adams Holbrook of Worcester Polytechnic Institute and C. Weston Russell of Wyman Gordan Co.

Welding in Steel Mill Is Subject at Dayton Meeting

Reported by James W. Poynter
Asst. Met., Army Air Corps, Wright Field

Dayton Chapter—at the Nov. 12th meeting Dr. William G. Theisinger, director of welding research of the Lukens Steel Co., discussed "Welding Practices in the Steel Mill". Included were remarks on the selection of steels, the metallurgy of the welding process, and the techniques of welding.

The talk was well illustrated with slides. Motion pictures showing the operation of the world's largest plate mill and the forming of large flanged drum ends were presented.

The coffee talk on the "National Power Situation" was given by O. B. Reemelin, vice-president of the Dayton Power and Light Co.

Gillett Shows How Metal Shortages May Lead to Scarcity in Substitutes

Reported by Robert D. Stout
Lehigh University

Lehigh Valley Chapter—H. W. Gillett of Battelle Memorial Institute discussed "Substitutions for Scarce Metals" at the November meeting.

Dr. Gillett emphasized how the extraordinary need for a metal in one application may lead to shortages or tight situations in a series of other metals.

As an example he mentioned the use of brass for cartridge cases which leads to shortages in copper and zinc. The use of other metals as substitutes for these may in turn create a tight condition in the supply of the substitutes.

Examples were given by the speaker to illustrate how steels can be selected which will minimize the drain on strategic alloying elements, will take advantage of existing alloy scrap supplies, and will ease the load on overtaxed electric melting facilities.

In the discussion which followed, C. H. Herty supplied information concerning manganese and aluminum supplies. J. W. Juppenlatz of Treadwell Engineering Co. described some of the difficulties that steel casting foundries face in the use of lower aluminum content deoxidizing alloys.

FBI to Tell Chapters How Members Can Aid in Enforcement

The Federal Bureau of Investigation has solicited the cooperation of the American Society for Metals in connection with its defense program. It is felt that individual members can be of considerable help to the officers and special agents of the Bureau in its program of law enforcement.

Arrangements can therefore be made with the FBI to provide coffee speakers for chapter meetings, where they will discuss the work of the Bureau. Chapter officers interested in securing such coffee speakers should get in touch either with the national office of the A.S.M. or the local field office of the FBI, a list of which has been sent to chapter officers.

Text of the letter from Director J. Edgar Hoover to W. H. Eisenman, national secretary of the A.S.M., concerning such cooperation follows:

DEAR MR. EISENMAN:

Mr. L. V. Boardman, Special Agent in Charge of our Cleveland Office, has advised me of his recent conversation with you and of your desire to assist this Bureau in connection with its defense program.

In the summer of 1939, the President of the United States placed upon the FBI the responsibility of handling and coordinating all investigative work in connection with the internal security of the United States. Since that time, the force of trained Special Agents of the Bureau has been increased threefold and extensive training programs have been conducted for police which have reached over 150,000 law enforcement officers. We thus have today a fully trained force of experienced officers handling the law enforcement work of the Nation.

I do not feel that investigation of national defense matters should be made by private citizens or groups of individuals but should be left in the hands of officers trained for that purpose. The FBI and law enforcement generally, however, need the support and assistance of the members of organizations such as the American Society for Metals. If our work is to continue to be successful, I personally feel that this assistance can best be rendered by individual members reporting directly any information which comes to their attention regarding subversive activities to the Special Agent in Charge of the nearest office of the Federal Bureau of Investigation. The Special Agents in Charge of our offices are always happy to have the citizens of the various communities call upon them at any time and any assistance or suggestions which are made will be deeply appreciated.

Should the members of your various organizations desire to have a more complete discussion of this phase of our work and the manner in which they can assist, I know that the Special Agents in Charge of our field offices, if called upon, will be glad to arrange to meet with your members in the future.

With best wishes and kind regards,

Sincerely yours,

J. EDGAR HOOVER

Armor Plate Discussed

Reported by Herman J. Van Zyl
Keeler Brass Co.

Grand Rapids Group of Detroit Chapter—James McElgin, manager of the Metal Products Division of E. F. Houghton & Co., spoke on "Heat Treatment of Steel for Defense Industries" at the November meeting.

Mr. McElgin explained the different types of armor plate, giving type analyses. He also brought out the differences in service between battleship armor and aircraft and tank armor, the latter being a steel of uniform hardness and the heavy plate being a soft steel with a deep case.

Minutes of the Board meeting on page 3.

To Aid Industry On Technical War Problems

A.S.M. War Products Advisory Committees are being formed by many chapters of the American Society for Metals all over the country. Function of these committees will be to provide advice on technical war production problems and be of every possible service to firms manufacturing war materials in the community in which the chapter is located.

There will be no charge for this service. The entire activity will be carried on with the single idea of service to the country and to industry.

First designated as National Defense Advisory Committees, this activity was suggested in a letter from President Stoughton, for the Board of Trustees on Nov. 14, and the background for the proposal is outlined in the minutes of the meeting of the Board on page 3.

Defense efforts have since been changed to victory efforts, however, and it was decided that the name War Products Advisory Committee more adequately described the present and future work of the committee and should be the name used.

18 Chapters Already Organized

Response to the suggestion from the national office for an ASM-WPAC was immediate and enthusiastic. Up to time of going to press, the Baltimore, Boston, Canton-Massillon, Cincinnati, Cleveland, Columbus, Dayton, Detroit, Hartford, Milwaukee, New Haven, New Jersey, New York, Oregon, Peoria, Rhode Island, St. Louis, and Toledo Chapters have notified President Stoughton that they have appointed committees to study the local situation. Some have proceeded with the organization of an ASM-WPAC.

The first chapter to complete its organization and preparation for wartime activities was the Canton-Massil-

(Continued on page 8)

Compliments

To R. C. Dalzell, technical advisor of the Baltimore Division of Revere Copper and Brass, Inc., past chairman of the Baltimore Chapter A.S.M., on his election as president of the Baltimore Alumni Association of Tau Beta Pi, honorary engineering fraternity.

To D. S. Jacobus, advisory engineer, Babcock & Wilcox Co., on the dinner honoring his retirement as chairman of the Boiler Code Committee of the American Society of Mechanical Engineers.

To A. C. Denison, president of the Fulton Foundry & Machine Co., Cleveland, on the presentation of a gold watch, for meritorious service, from the Meehanite Research Institute of America, Inc.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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President Stoughton Speaks at Boston

Reported by Paul Ffield
Materials Engineer, Bethlehem Steel Co. Shipbuilding Div.

Boston Chapter—The November meeting was the occasion of the visit of the A.S.M. national president and secretary to Boston.

Bill Eisenman in a delightful coffee talk not only gave us some of the highlights of the Society affairs, but also included a discussion of some of his farming problems.

After dinner at a brief but impressive ceremony, Chairman Burnett presented retiring Chairman R. H. Harrington with his certificate of office.

President Stoughton's talk was particularly appreciated because he so clearly defined the seriousness and importance of strategic elements. His manner of presentation was refreshingly clear and discussion from all sections of the floor followed.

President Stoughton also brought us first-hand news from George B. Waterhouse, who is at OPM and is being very much missed at Boston this season.

Cr, Ni, V, Mo, W Covered In Discussion on Alloys

Reported by V. C. Leatherby
Eclipse Fuel Engineering Co.

Rockford Chapter—Walter Crafts, research metallurgist of the Union Carbide and Carbon Research Laboratories, Inc., Niagara Falls, N. Y., was the principal speaker on Nov. 26 at the dinner meeting held at the Elks' Club.

Mr. Crafts' topic was "The Effects of Alloys in Steel". He discussed uses of chromium, nickel, vanadium, molybdenum, and tungsten in higher alloyed steels as well as in low alloyed steels used in structural and heat treated parts.

C. R. Wiggins, chief metallurgist of Northwestern Steel and Wire Co. of Sterling, Ill., introduced the speaker, and later presided over a general discussion.

The business meeting was featured by announcements by Chairman J. N. Harris, chief metallurgist, Rockford Drop Forge, of the next meeting celebrating the 20th anniversary of the joining of the local chapter with the National A.S.M.

Announcement was also made regarding the coming educational course beginning Jan. 15 on the "Inspection of Metals".

Paul Eddy Is Speaker at Calumet Chapter

At Calumet November Meeting: D. E. Wilson, Studebaker Corp., Chapter Chairman; W. Paul Eddy, General Motors Truck and Coach, Speaker, and F. W. Greenlee, Metal & Thermit Corp., Technical Chairman.

Automotive Service Failures Illustrated; Measures Taken to Prevent Recurrence

Reported by Edward Troy
Metallurgist, Inland Steel Co.

Calumet Chapter—W. Paul Eddy, in charge of metallurgical service and welding departments, General Motors Truck and Coach, addressed a dinner meeting held Nov. 18 on "Automotive Service Failures".

Mr. Eddy presented slides showing parts which failed in service from many different causes, and explained the results of investigation conducted on these parts and measures taken to prevent recurrence of the failures.

Shafts which fail in torsional shear are often so battered that the mechanism of the fracture cannot be determined. Failures which start with bending fatigue can be detected, since the center point of failures of this type is off the center of the shaft in the direction away from the starting point of the bending fatigue. End views of shafts which failed in torsional shear were shown to illustrate this point.

A connecting rod that failed in fatigue which started in a burned portion of the steel; a helical gear in which the crack developed through misalignment causing the edges of the teeth to be overloaded; and several spline shafts which failed in fatigue, the cracks in these cases proceeding first longitudinally and later transversely to cause the failure, were illustrated.

An interesting case of crankshaft fatigue failure through overload was cited in which shot blasting of the vital areas provided the necessary margin of safety.

Mr. Eddy showed examples of gears and ball bearings which failed in compression fatigue, the latter of which came about through oxidation of the lubricating oil which caused a build-up of solid matter on the bearing races. Springs and bearings which failed through corrosion fatigue were shown.

The lively discussion following the talk showed that steel men have an intense interest in the performance of steel as well as its manufacture.

New York Finishes Educational Lecture Series on Inspection

New York Chapter's educational activities included five lectures on "Inspection and Testing" preceded by the OPM lecture on heat treatment of molybdenum high speed steels. Dates and subjects were as follows:

Oct. 9—Heat Treatment of Molybdenum High Speed Steels, by H. J. Stagg, Crucible Steel Co.
Oct. 16—Gages and Gaging, by J. B. Wilkie, Pratt & Whitney Co.
Oct. 30—Surface Inspection, by J. A. Kearney, Crucible Steel Co.
Nov. 6—Tensile and Hardness Testing, by A. P. Gagnebin, International Nickel Co.
Nov. 13—X-Ray Inspection, by R. G. Tobey, Eastman Kodak Co.
Nov. 27—Impact Testing, by W. W. Werring, Bell Telephone Laboratories.

Mr. Stagg gave a brief history of high speed steels followed by specific instructions for their heat treatment. His presentation was greatly clarified by his skillful use of the well known S-curve relationship through which he explained the underlying metallurgical reasons for the various operations.

Mr. Wilkie supplemented his talk by an extensive exhibit of gaging equipment which emphasized the great change in gaging since the last war.

Mr. Kearney discussed the closely related topics of surface inspection and macro etching from the viewpoint of the steel manufacturer.

The different types of hardness testing machines and their relative advantages with respect to different practical applications were discussed by Mr. Gagnebin. The second half of his talk was devoted to the significance of the tensile test diagram and its relationship to other physical properties.

Mr. Tobey sketched the history and application of X-ray and gamma-ray technique including the practical hints for obtaining reproducible and satisfactory results.

After describing the various commercial impact machines and types of specimens employed, Mr. Werring, in the final lecture, explained how the impact results are standardized and correlated with actual performance.

Transactions Index Prepared

An index of Volume XXIX of TRANSACTIONS, covering the four quarterly issues in 1941, is being prepared and will be available about Jan. 15. There is no charge to members for this index. Requests should be sent to the American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio.

Bates Gives Plastics Talk

Reported by H. E. Hostetter
Metallurgical Engineer, Climax Molybdenum Co.

St. Louis Chapter—In recognition of the support given by the contingent from the nearby Alton, Ill., region, St. Louis Chapter journeyed to the Mineral Springs Hotel of that city for the monthly dinner meeting held Nov. 21.

The speaker of the evening, A. Allan Bates of Westinghouse Electric and Mfg. Co., lured his audience to the meeting with the subject, "Modern Trends in Metallurgy" and then proceeded to hold forth with his justly famed esprit on the history, classification, chemistry and applications of plastics.

His talk has been given before other Chapters of the A.S.M. and reported in former issues of THE REVIEW.

Small Plants Hardest Hit by Metal Scarcity

Reported by Fred P. Peters
Associate Editor, *Metals and Alloys*

New Jersey Chapter—A story of "hard times ahead" for many small non-defense plants and of OPM's efforts to soften the blow while still conserving supplies of vital metals was told by Harvey A. Anderson, chief of Conservation and Substitution Branch, Bureau of Industrial Conservation of the OPM, at the Nov. 17th meeting on "Modern Non-Ferrous Metals and Their Substitutes".

Mr. Anderson, who is on leave of absence from his Western Electric post, explained just how the Conservation Bureau functions and what some of the near-future supply trends may be.

The basic formula employed in attacking conservation problems by Mr. Anderson's group is a listing of seven critical base metals in descending order of stringency, *viz.* magnesium, aluminum, nickel, copper, zinc, lead and steel. Army and other engineers are then advised to shift designs, wherever possible, down toward the end of the list (or off it entirely).

Non-Defense Industries Aided

The Conservation Bureau, Mr. Anderson explained, is interested not only in conserving vital defense metals for military and naval uses, but also in conserving as much metal as possible for the unfortunate "non-defense" industries. For example, the Army and Navy are now cooperating with the conservation group by avoiding the specification for non-combatant equipment of those metals currently denied the non-defense industries.

Typical of the non-defense industries nearly crippled by the recently imposed drastic copper restriction is the cheap-jewelry field, which is frantically attempting to apply wood, plastics, sterling silver, rolled-gold plate, indium-plate and other materials.

And typical of the OPM's practical efforts to increase the proportion of copper available for civilian goods is current study of the possibility of making cartridge cases of *steel* instead of brass. Such a development, if successful, would release for other uses much of the 900,000 tons of copper and 450,000 tons of zinc that are now destined for cartridge cases in 1942.

New Mines for Copper

One changeover that is certain to occur very soon is the replacement of copper by steel for automobile radiators. The total supply of copper may also be increased by operation of "unprofitable" mines, the product to be sold below the copper price ceiling but with the government paying the owners for the extra cost of operation.

Among the other non-ferrous metals the situation is hardly better. The 1942 requirements for magnesium *just for flares and incendiary bombs* are more than the *total* estimated supply of the metal available.

Eventually, but not in 1942, the aluminum supply will overtake defense demand and that metal can be more generally allocated to civilian industries. Nickel is running away at an accelerating pace. A shortage in zinc, which so far has held up well, is predicted.

In general, even the favorite substitutes of a few months ago are now under such pressure as to be "short"—lead and phenol formaldehyde plastics, for example—and broader, still more drastic restrictions are to be expected soon, Mr. Anderson disclosed.

Minutes of the Meeting of A.S.M. Board of Trustees

A MEETING of the Board of Trustees of the American Society for Metals was held in Cleveland on Nov. 14, 1941.

Present were Bradley Stoughton, president; H. J. French, vice-president; F. B. Foley, treasurer; W. H. Eisenman, secretary; O. E. Harder, E. L. Bartholomew, N. F. Tisdale, and K. R. Van Horn, trustees. C. Y. Clayton, trustee, was absent.

Upon motion by Mr. French, seconded by Mr. Foley and unanimously carried, the minutes of the previous meeting were approved.

Following a custom established in previous years the Secretary read to the Board a compilation outlining the functions and duties of the Board of Trustees and the Secretary.

The Board of Trustees then gave consideration to the appointment of members to national committees, and on motion made, seconded and unanimously carried, the recommendations of the President for appointment to the various committees indicated were approved: (Complete personnel of the committees is shown on page 5.)

The Board of Trustees then gave consideration to reports from Treasurer Foley, who first presented the minutes of the meeting of the Finance Committee as follows:

Finance Committee Minutes

A meeting of the Finance Committee, A.S.M. was held in Cleveland on Nov. 13, 1941.

Present were: F. B. Foley, treasurer; Bradley Stoughton, president; H. J. French, vice-president; K. R. Van Horn, consultant; W. H. Eisenman, secretary; L. S. Fletcher, G. M. Rollason, Leon Slade, C. W. Ohlson, and Wm. Horner, Cleveland Trust Co.

The first item on the agenda was the preparation of the budget for the fiscal year, 1941-42. After the budget had been considered item by item, it was moved by Mr. Rollason, seconded by Mr. Van Horn and unanimously carried, that the budget be approved and recommended to the Board of Trustees for adoption, but at the same time to call the attention of the Board to the fact that the budget made no provision for reprinting or printing a new edition of the Handbook in case this became necessary.

Upon motion by Mr. Van Horn, seconded by Mr. Fletcher and unanimously carried, the two advertising accounts receivable, as listed separately, were directed to be left for collection.

William Horner, vice-president of the Cleveland Trust Co., counsellor on the investment account of the A.S.M., arrived and discussed each of the items in the portfolio. Mr. Horner made the following recommendations:

That sometime after the first of the year the Society should give consideration to the purchase of $50,000 additional U. S. Savings Bonds G and that at a propitious time certain railroad stocks should be disposed of.

Upon motion properly made, seconded and unanimously carried, the Finance Committee accepted the recommendations of Mr. Horner and voted to make similar recommendations to the Board of Trustees.

Upon motion by Mr. Van Horn, seconded by Mr. Stoughton and unanimously carried it was decided to recommend to the Board of Trustees the transfer of $50,000 from the commercial account to the investment fund so that if around the first of the year the counsellor's recommendation for the purchase of Government bonds or common stocks should be carried into effect, the money would be available, providing the commercial account of the Society remained in satisfactory working condition after this transfer.

Upon motion properly made, seconded and unanimously carried, the meeting adjourned.

Consideration was then given to Mr. Horner's recommendations relative to railroad and other securities.

Upon motion by Mr. Bartholomew, seconded by Mr. Van Horn and unanimously carried, this recommendation of the Finance Committee was approved.

Upon motion by Mr. Foley, seconded by Mr. Bartholomew and unanimously carried, the recommendation of the finance committee was accepted and approved, and $50,000 ordered transferred from the commercial account of the Society to the investment fund for later investment as provided in the recommendations.

The board then reviewed the 1941-42 fiscal budget item by item as presented and recommended by the Finance Committee.

Upon motion by Mr. Foley, seconded by Mr. French and unanimously carried, the budget was approved as presented.

Upon motion properly made, seconded and unanimously carried, the report of the Finance Committee was then approved in its entirety.

The Secretary then presented a report covering the 1942 National Metal Congress and Exposition.

Detroit Selected for 1942 Show

Upon motion by Mr. Foley, seconded by Mr. Tisdale and unanimously carried, Detroit was selected for the 1942 National Metal Congress and Exposition.

Upon motion by Mr. Foley, seconded by Mr. Van Horn and unanimously carried, it was decided that the 1943 National Metal Congress and Exposition should be held in Chicago, and the 1944 National Metal Congress and Exposition should be held in Cleveland, providing the Secretary could make satisfactory arrangements.

Upon motion by Mr. French, seconded by Mr. Bartholomew and unanimously carried, a resolution of appreciation to the cooperating societies participating in the Philadelphia Show was adopted, and the Secretary was instructed to extend an invitation to them to participate in the 1942 event in Detroit; at the same time advising them of the definite action which had been taken by the Board of Trustees for the holding of the 1943 Show in Chicago and the 1944 Show in Cleveland, and expressing the hope that these cities might be acceptable to these societies as locations for their meetings.

Consideration was given to the fact that there was a possibility that the facilities for the 1942 annual banquet of the Society to be held in Detroit would be much smaller than in previous cities. So it was suggested that at the proper time THE REVIEW should carry a story giving a comparison of the size of the Philadelphia banquet and the Detroit banquet, also indicating that a block of tickets would be held up to a certain time for reservation by individual members of the Society.

Transactions Papers to Be Preprinted

The Board then gave attention to the minutes of the Publication Committee in which a recommendation had been made to the Board requesting the circulation of preprints of a non-convention paper prior to its publication in the TRANSACTIONS. Upon motion by Mr. Harder, seconded by Mr. French and unanimously carried, it was determined that papers presented for publication in the TRANSACTIONS and accepted for publication but not presented at an annual convention should be made available for review to members of the Society by carrying in THE REVIEW a statement that the paper was in preparation for publication and that anyone interested in receiving a copy *for the purpose of submitting discussion* could receive galley proofs by notifying the national office.

The Board then reviewed the minutes of the Educational Committee and the cooperative work at present in progress with the Ohio State Research Foundation. The film in process of production was not available for review by the Board due to delays in its completion.

The Secretary presented a report on the standing of the chapters as of Nov. 1, 1940 and Nov. 1, 1941.

The Board gave consideration to the heavy increase in membership of the Society, the rapid depletion of the supply of Handbooks, and the increase in required number of copies of all other Society publications.

The Secretary reported that the rate of increase for the first two weeks of November had been at the same rate of increase as was the heavy October accrual (660 members).

It was felt that during visits by members of the Board of Trustees (or the President and the Secretary) with chapters that they should point out to the executive committee the desirability of careful selection of new accruals, a disregard of competition, a careful and restrained distribution of application forms, and thus insure a permanent type of new members.

Defense Committees Planned

The Secretary then presented the following report to the Board on A.S.M. chapter cooperation in national defense:

I would like to recommend that the Board of Trustees suggest that each chapter of the Society organize an A.S.M. National Defense Advisory Committee to assist in the present emergency. The membership of the chapters in communities where they have been established represents the essence of metallurgical and manufacturing ability and there is a responsibility resting upon A.S.M. Chapters to avail themselves of this opportunity to be of service to the country and to the metal industries within their sphere of influence.

It is proposed that the executive committee of each chapter should appoint a committee of from six to ten members representative of the metallurgical and manufacturing abilities of the chapter and that this group should be set up as an advisory committee on metallurgical problems and should make its services available and free to all firms located within a radius of the chapter activities which are working on defense products.

The only qualification that should be required of firms desiring this A.S.M. service is that the product which the firm is manufacturing is either a defense item or is used in the manufacture of defense material.

In other words, this committee would not be set up as consultant for manufacturers of non-defense products but would only attack problems which pertained to the production of items for defense or to such other activities as it might be requested or directed to do by proper Governmental agencies.

Many chapters have splendidly assisted defense in an educational way in the training of inspectors and disseminating knowledge relative to metals but it now seems that in addition to a continuation of the successful educational activities, the chapters of the A.S.M. are in a position and should accept this opportunity and responsibility for a wider, more extended and needed service such as would be provided by the organization of a defense advisory committee.

It could be the recommendation of the Board that in the work of the chapters from now on the securing of new members be de-emphasized and that the membership committee's activities be changed from the securing of new members to that of being a service committee whose time and energies will be used to ferret out the small and large defense manufacturing plants that may have metal and metallurgical problems that could rightly and advantageously be referred to the chapter's National Defense Advisory Committee and thus perform a splendid community and national service.

Service Incurs No Obligation

With this A.S.M. National Defense Advisory Committee organized a letter should be sent to every chapter member, manufacturer and fabricator of metal products in the chapter's territory, notifying them of the formation of this committee and indicating that the committee is willing to give them counsel and advice at no cost on any defense-manufacturing problem, pointing out when and where the committee will be in session, giving the personnel and qualifications of the committee, and such other pertinent information as desired, but stating definitely that there is no obligation connected with the use of this service but that the A.S.M. National Defense Committee has been organized as a service to industry and to defense.

The Government defense agencies' operation in each city (O.P.M., O.E.M., Ordnance District, Contract Distribution, etc.) should be contacted and notified and the service explained and a definite recording made in their minds and offices of the availability of this committee.

Some expense will be incurred in securing lists, letterheads, envelopes, processing letters, addressing, mailing and postage, which would be a legitimate charge against the reserves or current expenses of the chapter; however if any chapter wishes to organize and carry on the work of this advisory committee and feels that they do not wish or are unable to charge it against the chapter's operating expenses or reserves, they may send a request to the national office giving the formation and make-up of the committee and presenting a budget of expenses for the items as listed above, and the request will be presented to the finance committee of the Society and given proper consideration.

As the members of these committees are reported to the national office, I believe it would be possible for special bulletins to be prepared and forwarded to them, giving them suggestions and form letters in which they might bring to the attention of the industry in their vicinity more intensive realization of the availability of this committee and its works.

It is logical to suppose that a national defense advisory committee could be organized by this board, reporting and operating from headquarters, but I feel such a committee would experience difficulty in locating definite problems to carry on or acting promptly (speed is essential) and that therefore the greatest good could be accomplished, as well as the greatest opportunity for service to national defense and to the defense plants in the neighborhood where the chapter is located, by having these committees organized in the chapters themselves.

A few chapters to our knowledge have done some work along this line but I believe a definite recommendation by the Board of Trustees would give this movement and the chapters the necessary impetus to make it a successful operating national defense service.

As stated above, this entire activity should be carried on with the single idea of service to industry and defense in the mind of all concerned. No effort or attention should be directed to an increase in membership. Membership is not the purpose or any part of the purpose in the formation of this advisory committee.

It will be necessary that the organization and availability of this committee be given the widest possible **local** circulation and all mediums for the dissemination of this information would of course have to be invoked.

The work of the A.S.M. National Defense Advisory Committee will fall on the shoulders of "already busy men". This is taken for granted because we also know it's the busy man who serves his country best.

The Board of Trustees was pleased with the suggestion contained in the report and contributed a number of suggestions looking toward its more efficient operation.

Upon motion by Mr. French, seconded by Mr. Bartholomew and unanimously carried, the Board of Trustees approved the recommendations presented in the report of the Secretary and authorized that they should be placed into active operation at the earliest possible date.

Educational Courses Discussed

It was suggested by the Board that in the next communication to the chapter executive committees the Secretary should restate the opinion of the previous Board of Trustees that it was the feeling of the Board that it was *undesirable to require membership in* the Society in order for an individual to be able to enroll in the educational courses presented by the chapters. The Board felt that in case it was necessary to make a charge to meet the expenses incurred in the presentation of these lectures this charge to nonmembers should be considerably less than the cost of membership and that the entire amount of fees thus collected should go to the chapter to defray the expenses of the course.

An invitation was received from the trustees and faculty of Temple University for the A.S.M. to have a representative at the inauguration of Dr. Robert L. Johnson as president of Temple University on Thursday, Dec. 4. Upon motion properly made, seconded and unanimously carried, Mr. Francis Foley was designated to represent the Society.

Mr. Foley presented the suggestion that the board request the Publication Committee to endeavor to evaluate the interest involved in a paper scheduled for presentation at annual conventions so that a better allocation of the time available for presentation might be made. It was thought possible that when the reviewer reads the paper he might at that time indicate on the report the amount of time he thinks should be required to present the paper properly so as to allow for discussion.

Upon motion properly made, seconded and unanimously carried, the meeting adjourned.

Four Ways for Improving Machinability Named

Screw Machine Steels Poor for Carburizing and Welding, Jameson Says

Reported by Ellis Blade
Consulting Engineer

New York Chapter—At the first regular dinner meeting on Nov. 10, A. S. Jameson of the International Harvester Co. presented an interesting, informative talk on "Screw Machine Steels". Norman Woldman of the Eclipse Aviation Corp., serving as technical chairman, led a lively discussion touching all phases of the talk.

Machinability, according to Mr. Jameson, is commonly improved in one of four ways — addition of sulphur and/or phosphorus, control of the microstructure, cold drawing, or addition of lead.

Manganese Used With Sulphur

The first two increase the brittleness of the chip by breaking up the continuity of the ferrite grains. Sulphur causes a loss in strength, greatest in the transverse direction, but the addition of manganese brings improvement.

Screw machine steels are poor for welding and spinning, and should be used with care when subjected to transverse or torsion stress. For carburizing applications a low carbon steel containing phosphorus and sulphur is often used, for sulphur does not retard the carbon absorption.

Because of the difference in melting practice, screw machine steels have poorer carburizing properties than plain carbon steels. Manganese improves the carburizing properties.

Cold drawing is probably the most important single factor in improvement of machinability. A ¼-in. draft increases the brittleness of the ferrite, making an easier-breaking chip. The recent tendency is to increase the draft to ⅛ in.

The increased warpage and decreased impact values due to cold work may be improved by stress annealing.

Lead Addition Discussed

Lead addition, which is fairly new, improves machinability without impairing the transverse impact strength, a factor of advantage over sulphurized steels. A good part of the lead is thought to remain in the metallic state.

A simple, practical test for transverse strength, or rather toughness, is to drive a cone through a ring of the material, and note the amount of cone travel before the ring splits.

Recent machinability standards are based on tool life or piece-production rate, taking account of dimensional accuracy and finish, a standard test piece being subjected to specified turning, facing, boring, and tapping operations. Finish quality may be determined from a profilogram.

Mr. Humphrey opened a discussion on the possible harmful effects of lead additions, and a difference of opinion was found to exist on this point, especially in the aircraft industry.

Notre Dame Hears McQuaid

Reported by E. P. Klier
Graduate Assistant, University of Notre Dame

Notre Dame Chapter — Harry W. McQuaid, assistant chief metallurgist, Republic Steel Corp., spoke at the November meeting on "Making the Most of Carbon and Low Alloy Steels". Mr. McQuaid's talk has been reported in detail in the November issue of THE REVIEW on the occasion of its presentation before the Buffalo Chapter.

The lecture was illustrated with numerous slides and was enthusiastically received by the Notre Dame members.

Speaker and Officers, New York Meeting

Photographed at New York Chapter Meeting Nov. 10: (Above) Speaker A. S. Jameson and Technical Chairman Norman Woldman. (Below) Capt. T. N. Holden, Chapter Secretary, and Robert G. Humphrey, Chairman.

Three Types of Salt Baths Are Used For Heat Treating

Reported by Walter M. Saunders, Jr.
Consulting Chemist and Metallurgist

Rhode Island Chapter — The term "salt bath" means nothing more nor less than a heating medium to Dr. Haig Solakian, director of research of the A. F. Holden Co., New Haven, Conn., who addressed the Nov. 5th meeting on "Salt Baths for the Heat Treatment of Steels".

Such a definition obviously eliminated consideration of carburizing and nitriding baths, which are alleged to be composed of various salts, and no strangers to the speaker. In spite of this omission, interest was high in what Dr. Solakian had to say on salt baths as heating mediums only, as evidenced by the many questions asked about specific salt bath problems.

Three types of salt baths are used for heat treating; namely, one for low temperature, such as 1450 to 1600° F.; one for medium, such as 1650 to 1850° F.; and one for high speed steel, such as 2150 to 2350° F. Dr. Solakian covered the compositions used, the characteristics of a satisfactory bath, the advantages of salt baths in general, and salt bath operation.

In answering questions fired in large numbers, Dr. Solakian brought out the importance of proper control of temperature to avoid changes in composition of the bath; the desirability of preheating, if possible; and the absolute necessity of remembering that salt baths heat much faster than atmospheric furnaces.

As an example of the last, he told of an amusing incident where a manufacturer was heating a tool for 30 min. in salt when 2 min. was about the limit needed. He stated that, generally speaking, only 1 to 1½ min. immersion in the bath is required for ⅛-in. rounds, and about 2½ to 3 min. for the ⅜-in. sizes.

The talk was of great value at the present time, when salt baths are receiving more and more notice.

As the coffee speaker at the dinner preceding the meeting, J. Burleigh Cheney, president of the Barrington Brick Co., Barrington, R. I., took as his subject "Bricks is Bricks", and related many interesting facts, most of them humorous, about his 200-year old company.

Traces Development of Graphitic Steels, Shows Analysis and Properties

Reported by J. M. Gotshall
Ass't Chief Chemist, Timken Steel and Tube Division

Canton-Massillon Chapter — Bill Wamby, formerly of the Cleveland Indians baseball team, gave the coffee talk on Nov. 6, citing some of his experiences in the game.

The technical address, "Properties and Applications of Graphitic Steels", was presented by Fred R. Bonte, development engineer of the Steel and Tube Division, Timken Roller Bearing Co.

Mr. Bonte told in his talk of the various steps taken in development of these steels, of the many elements experimented with to obtain data on their graphitization effect, and finally, by means of slides, showed the analysis, deformation curves, and hardness developed.

He brought out the fact that the amount of graphite necessary for an application may be developed by heat treatment and then retained in the hardened structure.

The machinability, along with the very excellent physical properties of the treated material, and the long working life without reconditioning, were advanced as some of the excellent qualities of graphitic steels.

Double Importance Of Molybdenum in War Metals Stressed

Reported by J. R. Morris
Dendoff Springs, Ltd.

British Columbia Chapter—That molybdenum is playing a doubly important part in the production of the materials of war was emphasized by Norman F. Tisdale, chief metallurgist of the Molybdenum Corp. of America, and national trustee, A.S.M., on Nov. 20 at Brock Hall, University of British Columbia.

The speaker pointed out that the fact that ample supplies of molybdenum are now available on this continent permits the ready substitution of the metal in alloy combinations which previously required large amounts of scarce, or "critical" metals. Further, the wider use of molybdenum has resulted in the development of many new applications in which superior physical properties have been demonstrated.

It was explained that the substitution of molybdenum in a number of alloys has proved surprisingly beneficial in that the new, or increased, molybdenum content serves to intensify the desirable qualities of other alloying elements such as nickel and chromium.

The net result has been that as suitable physical properties have been obtained by adding molybdenum and decreasing the other alloys, the latter have been conserved for other much needed uses.

In making a plea for conservation of alloying metals the speaker insisted that alloys should be used only in products which are to be heat treated. It is a metallurgical crime to add a special alloying element if similar properties could be obtained by making the same part of unalloyed steel and subjecting it to suitable heat treatment.

A series of excellent slides illustrated the effect of molybdenum additions to many different products—the precipitation of finely divided graphite in cast iron; the deep hardening properties of molybdenum steels; creep resistance; improved physical characteristics; the similarity of modern molybdenum high speed steels to standard tungsten steels; etc.

The many questions which followed bespoke the great interest taken in Mr. Tisdale's timely address. Over 100 members attended the dinner meeting at which reports of the various chapter committees were presented and plans were laid for the institution of educational courses.

Formula for Good Tools Has Four Factors

Reported by A. J. Kleiner
Foreman, Hamilton Watch Co.

York Chapter—The annual Lancaster meeting was held on Nov. 12 with G. E. Brumbach of the metallurgical staff of Carpenter Steel Co. as speaker.

He pointed out that the application of tool steels is a most timely subject inasmuch as we are in the greatest era of metal usage in history. It is obvious that we cannot get all of anything that we are able to use in these pressing times. Therefore we must get all that we can from what we can get.

Mr. Brumbach then advanced a "Formula for Good Tools" which he broke down to four factors, namely:

1. Proper design of the tool.
2. Accuracy of size and shape and quality workmanship.
3. Selection of the proper steel.
4. Correct heat treatment.

Selection of Steel Perplexing

Mr. Brumbach dealt only with the last two metallurgical factors, since the first two might be considered as problems of design and manufacture.

Slides were used to show how, by intelligent analysis, a faulty tool can be traced to the material itself. Out of dozens of good steels on the market it is often perplexing to select the one which might give the best results. Thus was born the idea of the "Matched Set" method of steel selection developed by Mr. Brumbach's company.

Using a basic steel of approximately 1.1% carbon, which is one of average cost and has excellent properties, it was shown how this system can be used to solve a selection problem when the properties desired are known. By the arrangement of nine steels having varying properties of wear resistance, toughness, red hardness and deformation, the problem is materially lessened and the chances for success materially increased.

Surface Important in Heat Treating

After the first three factors have been applied comes the problem of preserving a job well done and making it useful by the proper heat treatment.

Mr. Brumbach pointed out that it is not only necessary to get the tool hard but that in many cases the condition of the surface must be very carefully controlled so as to get the maximum life out of the tool.

The atmosphere within the furnace is the controlling factor in getting a good surface. The steel manufacturers usually specify the type of atmosphere in which a particular steel should be heated and it must be adhered to as each has its own peculiarities.

Then comes the quench, which must be done in the proper liquid for all steels not air hardening. For many tools having recesses, holes or irregular shapes it is necessary to force the quenching medium into these places by means of jets.

Mr. Brumbach stated that often the heat treater is blamed for a failure which is not his fault but the result of not having the right equipment for the condition of the work. Here it is evident that a well-balanced design can often cure evils before they occur.

Chairmen of A.S.M. Standing Committees

M. Gensamer — *Publication*
R. L. Heath — *Constitution*
R. S. Archer — *Handbook*
A. A. Bates — *Educational*

New Members Appointed on Committees Confirmed at November Board Meeting

At the meeting of the Board of Trustees of the A.S.M. held Nov. 14, new appointments to the various national committees of the Society were announced by President Stoughton and confirmed by the Board.

In order that the members may have a roster of the standing committees as they are constituted at the present time, the complete personnel is listed below. The new appointments are shown in italic type and the numerals represent the date of expiration of membership.

Constitution and By-Laws Committee

Robert L. Heath, Indianapolis, Chairman, '42
Ernest Bancroft, Hartford, Conn., '43
A. L. Knight, Hartford, Conn., '42
Ray McBrian, Denver, '43
Kurt Siems, Cincinnati, '44
Norman F. Tisdale, Representative of the Board of Trustees

Educational Committee

A. A. Bates, Pittsburgh, Chairman, '42
R. T. Bayless, Cleveland, Secretary
Joseph G. Jackson, Philadelphia, '44
C. W. Mason, Ithaca, N. Y., '43
John T. Norton, Cambridge, Mass., '44
B. R. Queneau, New York, '43
W. M. Saunders, Jr., Providence, R. I. '42
T. H. Wickenden, New York, '43

Finance Committee

F. B. Foley, Philadelphia, Chairman
Leslie S. Fletcher, Philadelphia, '42
James P. Gill, Latrobe, Pa., '44
Zay Jeffries, Cleveland, '44
Walther Mathesius, Pittsburgh, '44
G. M. Rollason, Garwood, N. J., '42
Kent R. Van Horn, Cleveland, Consultant

Metal Progress Advisory Committee

Bradley Stoughton, President, A.S.M.
H. J. French, Vice-President, A.S.M.
W. H. Eisenman, Secretary, A.S.M.
R. T. Bayless, Assistant Secretary, A.S.M.
E. E. Thum, Editor
J. J. Crowe, New York City, '42
A. H. d'Arcambal, Hartford, Conn., '44
R. H. Hobrock, Detroit, '44
Zay Jeffries, Cleveland, '44
A. J. Phillips, Barber, N. J., '42
Roy G. Roshong, Chicago, '43
C. W. Ruth, Cleveland, '44
R. A. Wheeler, New York, '44

Metals Handbook Committee

R. S. Archer, Chicago, Chairman '42
J. E. Donnellan, Cleveland, Secretary
E. C. Bain, Pittsburgh, '43
G. V. Luerssen, Reading, Pa., '44
R. F. Mehl, Pittsburgh, '42
H. D. Newell, Beaver Falls, Pa., '43
H. B. Pulsifer, Cleveland, '42
A. P. Spooner, Bethlehem, Pa., '42
N. I. Stotz, Titusville, Pa., '43
Gordon T. Williams, Moline, Ill., '44
Lyall Zickrick, A.I.M.E. Representative
H. L. Maxwell, A.W.S. Representative
C. W. Obert, I.A.A. Representative

Publication Committee

M. Gensamer, Pittsburgh, Chairman, '42
R. T. Bayless, Cleveland, Secretary
J. B. Austin, Kearny, N. J., '44
L. S. Bergen, New York, '42
Walter Crafts, Niagara Falls, N. Y., '44
T. G. Digges, Washington, '43
E. H. Dix, Jr., New Kensington, Pa., '43
W. E. Jominy, Detroit, '44
E. G. Mahin, Notre Dame, Ind., '43
J. F. Oesterle, Madison, Wis., '42
Gilbert Soler, Canton, Ohio, '44
Clair Upthegrove, Ann Arbor, Mich., '44
John P. Walsted, Whitinsville, Mass., '42
A. W. Winston, Midland, Mich., '42
L. L. Wyman, Schenectady, N. Y., '43
J. F. Wyzalek, Harrison, N. J., '43

OPM Report on Moly Heat Treatment Discussed

Reported by C. A. Nagler
Instructor, University of Minnesota

Northwest Chapter—F. Lloyd Woodside, Climax Molybdenum Co., Detroit, who spoke on "The Heat Treatment of Molybdenum High Speed Steels" on Oct. 13, was well qualified to discuss his subject since he was a member of the special committee of the OPM which has just published "Tentative Recommendations for Heat Treatment of Molybdenum High Speed Steels".

Mr. Woodside's talk has been reported in the November issue of THE REVIEW, and the OPM committee report was published in the September issue of METAL PROGRESS.

Garand Rifle Is Demonstrated; Past Chairmen Honored

Reported by G. G. Wilcox
Metallurgist, Wallace Barnes Co.

Hartford Chapter—Past Chairmen's Night was held on Nov. 11 and a very successful one it was.

Out of 20 living past chairmen, 16 were present at the dinner, which is an eloquent testimonial to the continuing importance of the Society to its members.

D. J. O'Neil, the retiring chairman, was presented with the customary certificate in appreciation of his services, and most of the former chairmen contributed pertinent remarks when individually presented to the gathering.

The topic of the evening was "The Garand Rifle", and the speakers were E. L. Wood, and A. L. Woodworth, respectively plant metallurgist and principal technician of Springfield Armory, Springfield, Mass.

Mr. Wood scarcely needed introduction to the Hartford Chapter, since he formerly served as Chapter chairman, and also acted in the same capacity for the Springfield Chapter.

After outlining the history of the Springfield Armory, he discussed the Garand rifle from the standpoint of methods of inspection, heat treatment of parts and their properties and performance.

Mr. Woodworth, an Armory employee of 40 years standing, spoke about the specification which had to be met in producing the rifle, and described its operating features in comparison with weapons formerly produced at the Armory. He had with him one of the rifles which was used to illustrate many of his points, and which attracted much interest after the formal part of the meeting adjourned.

This meeting was restricted to members only, a practice which was inaugurated last season with the idea of making membership in the A.S.M. more desirable, and also to create better acquaintance among the members.

Aircraft Gears Dr. Woldman's Latest Topic

Reported by Fred P. Peters
Associate Editor, *Metals and Alloys*

New Jersey Chapter—As chief metallurgical engineer of Eclipse Aviation Div., Bendix Aviation Corp., N. E. Woldman has to know and to use an amazing amount of metallurgical information, all of which in due course he will have generously and patiently repropounded for New Jersey members.

A long step in this direction was taken on Oct. 14 when he addressed a joint meeting of the local chapters of the A.S.M. and American Society of Tool Engineers on "Machinability of Aircraft Gear Steels". This is about the sixth different topic on which Doc has lectured or instructed New Jersey metal men in the past few years.

Metal machining problems, he said, are too complex for efficient solution by just one man in a given shop. Metallurgist, tool designer and production man must work together if all the factors in each job are to be understood and controlled.

Generalizations about "machinability" are dangerous, Dr. Woldman indicated, even assuming standardization of criteria for that property. For example, among several gear steels, the one that is the easiest to machine in automatics may be the poorest performer in gear shaping, broaching and finishing.

With gear steels having less than 0.40% carbon, the best structure for screw machine operation is laminated pearlite, whereas with higher carbon steels (S.A.E. 3150, 4150, 6150) best machining on automatics is obtained with a spheroidized structure.

Laminated structures are the most desirable for such operations as facing, gear cutting, broaching and splining, whatever the carbon content.

With the higher carbon steels, Dr. Woldman's practice is to buy spheroidized steel for their performance in the automatics. Then, after turning, the steel is annealed to give a lamellar pearlite structure, which is ideal for the subsequent machining operations.

The choice that must be made between a steel or structure that machines well but distorts excessively, on one hand, and a combination that machines passably but delights the heat treater, on the other, is a major reason for the psychopathic tendencies frequently found among aircraft gear metallurgists, Dr. Woldman declared.

Southern Chapter Meets At Dinner With A.I.M.E.

Reported by J. Ernest Hill
Met., Tenn. Coal, Iron & R. R. Co.

Southern Chapter—First session of the season was opened on Oct. 14 at the Tutwiler Hotel in Birmingham in a joint dinner meeting with the American Institute of Mining and Metallurgical Engineers.

At the conclusion of the dinner an encouragingly high percentage of the Chapter's members and a number of visitors gathered in an adjacent ballroom where they heard a refreshing speech by Oscar E. Harder, assistant director of Battelle Memorial Institute and then national president of the American Society for Metals.

Dr. Harder gave an extremely interesting and informative treatise on "Developments in Physical Metallurgy". Preceding his speech Dr. Harder interspersed favorable comment on the interest and activity of the Southern Chapter with some of his spiciest stories.

Celebrate Cincinnati Chapter's Second Annual Dinner Dance

Cincinnati Committeemen and Chapter Officers: (Standing, Left to Right) Charles P. Devore, Secretary; R. H. Weber; R. R. Elsasser; G. F. Baumann; H. E. Friedlein; Stanton T. Olinger, Treasurer. (Seated, left to right) C. J. Robinson; William M. Ball, Jr., Vice-Chairman; A. P. Fischer; M. H. Brumble; George H. Gerdes; and Kurt Siems.

Mario Martellotti Assists the Magician by "Fanning the Rope to Keep It Cool" at the Chapter's Annual Party

"Frequency Rating" Used for Magnetic Inspection of Aircraft

Reported by Eugene P. Klier
Graduate Assistant, University of Notre Dame

Notre Dame Chapter—R. L. Heath, chief metallurgist with the Allison Division of General Motors Corp., presented an excellent address on "Aircraft Materials" at the October meeting.

After a brief historical introduction dating from the Wright Brothers and their homemade engine, the speaker stated that with present-day mass production methods, aircraft engines have been refined to such an extent that they deliver in the neighborhood of one horse power per pound of weight.

Of great importance in the manufacture of airplane engines are the methods of inspection. At the Allison plant the magnetic inspection method is much used. For this purpose a system called frequency rating has been devised.

This consists in the determination of the two factors "frequency" and "severity". Frequency is the number of Magnaflux markings for a given length. Severity is a quantity dependent upon the size of the marking. Material is rejected if its frequency rating exceeds a certain maximum limit.

Particular stress was laid upon the directional properties of materials as to machining difficulties and fatigue properties. This was illustrated by showing that in the case of one steel after a particular heat treatment, the fatigue limit in one direction was approximately one-third better than that in a direction at 90° to the first.

In the use of cast magnesium alloys a factor which is very important is the growth of the casting at engine temperature. To overcome this difficulty the part is aged at a temperature above engine temperature and then machined to size.

Of interest also is the use of X-rays in the examination of bearings. The speaker expressed great faith in this method of inspection, having found it quite reliable for the investigation of the bond of the bearing material with the steel back.

After a discussion of surface treatments Mr. Heath considered the role of synthetic rubbers as used in the making of tubing for the cooling system, engine mounts and gas tank linings.

Dinner Music, Dancing and Floor Show Entertain 300

Reported by Kurt Siems
Sales Engineer, Cincinnati Milling Machine Co.

Cincinnati Chapter—The second annual dinner dance was held Saturday night, Nov. 1, at the Kenwood Country Club.

Decorations were in keeping with the Hallowe'en season and so were the spirits of the nearly 300 members and friends present—a hilarious time was had by all.

A musical trio furnished excellent entertainment during the dinner and the one-hour floor show later in the evening was of a standard which merited the vociferous applause tendered it.

Of particular interest to his many friends were the efforts of Mario Martellotti (a prominent A.S.M. speaker and member of the Cincinnati Chapter) to assist a magician in a rope trick by "fanning the rope to keep it cool"; the fan somehow would come all apart while he handled it, but would always be in one piece as the magician took hold of it. The puzzle never was solved but nobody cared!

Defense Armament Affects Furnace Industry, Fuels

Reported by R. A. Shattuck
Metallurgist, Crucible Steel Co. of America

Syracuse Chapter—"Fuels and Furnaces" proved a most interesting topic as presented on Nov. 4, by E. G. de Coriolis, research director for the Surface Combustion Corp.

In connecting this subject with defense armament, Mr. de Coriolis reviewed some of the problems facing the furnace industry. In addition to the material shortages and the necessity of showing a high priority rating in order to obtain practically any type of furnace today, it was pointed out that in these times experimental work must be minimized and proven designs and ideas adapted to the diversified problems of defense production.

The exactness required in the various heating operations was exemplified by an obtainable tolerance of plus or minus 10° in the process of heating shells to 2250° F. for extrusion and piercing, in order to insure piercing exactly on center, and thereby reduce the machining operations.

The increased use of convection heating for temperatures up to approximately 1400° F. was stressed and illustrated with slides of furnaces used for the heat treatment of shells and shell cases, as well as guns in vertical furnaces for the prevention of distortion.

Of particular interest was the picture and description of the huge furnace in which naval gun turrets are assembled by welding and then heated for strain relief.

For the information of members of other chapters who may visit Syracuse, our meetings are held on the first Tuesday of each month at the Hotel Onondaga. Come in and make yourself known to Chairman Patterson.

23 Cold Mills Use 12% of All Bar Steel Produced—McDowell

Reported by C. A. Nagler
Instructor, University of Minnesota

Northwest Chapter—The November meeting was addressed by D. W. McDowell, metallurgist, Union Drawn Steel Division, Chicago. The subject for the evening was "Cold Finished Steels—Processing and Applications" and Mr. McDowell started his talk by giving a brief resumé of the advances made in the cold finishing process.

Some statistical values were given and an interesting point was that there are 23 cold finishing mills which use 2% of all the steel and 12% of all the bar steel produced.

A description was given of the method used in the cold finish mill. The hot-rolled bars are pickled to remove the scale. The bar is then cold drawn through a die to the desired shape.

The bar is pushed through the die to begin with and then is pulled through the die until it has been drawn to the proper dimension and length. The drawn bar is then put through a straighening machine.

In the ordinary mill cold reductions are made from $\frac{1}{32}$ to $\frac{5}{32}$ in. A series of values was given to show the effect of cold working on the physical properties of the steel, and the effects of low temperature annealing on cold-worked physical properties.

Mr. McDowell concluded his talk by showing a number of slides which illustrated uses for cold-finished steels. The meeting was then thrown open to discussion on cold-finishing steel and savings that can be made by its numerous applications.

Oxidizing Effect Of Open Hearth Is Emphasized

Reported by Edward Troy
Metallurgist, Inland Steel Co.

Calumet Chapter—A joint meeting with the Chicago Chapter of the American Institute of Mining and Metallurgical Engineers was held at the Woodmar Country Club on Oct. 14, with T. S. Washburn, assistant chief metallurgist, Inland Steel Co., as the speaker of the evening. His subject was "Principles of Basic Open-Hearth Practice and Its Effect on Steel Properties".

Mr. Washburn opened his talk with a discussion of the function of the open-hearth, which is to convert various types of ferrous materials into finished steel of a given composition and quality.

Type of Slag Affects Refining

He stated that the important feature to be kept in mind when studying open-hearth practice is that it is primarily an oxidizing process. The refining action depends upon the oxidation of impurities under basic conditions and only impurities that will be oxidized under these conditions can be removed.

Since the type of slag affects the rate and degree of refining, and the oxidation of the steel prior to and during the deoxidation period, the balance of the slag-forming constituents in the charge is important. The control of the slag composition is accomplished by adding both in the charge and as corrective additions during the refining period the required amount of lime to obtain the ratio of CaO to SiO_2 desired in the finishing slags.

The open-hearth process being primarily one of oxidation, it follows that toward the end of the refining period the bath contains considerable iron oxide as FeO, the amount of which is influenced largely by the carbon content. The deoxidation practice varies with the grade of steel and the carbon content.

Factors which affect the as-rolled tensile strength through different types of furnace practice are: *(a)* Deoxidation practice, *(b)* elements other than those shown in the analysis, and *(c)* ingot segregation.

Deoxidation affects the tensile strength through its prevention of carbon loss and because of its effect on the inherent grain size.

Additions Alter Tensile Strength

The approximate effect of elements not usually shown in the analysis on the tensile strength was stated to be as follows:

0.01% copper increases tensile 50 to 150 psi.

0.01% nickel increases tensile 100 psi.

0.01% chromium increases tensile 60 to 200 psi. (depending on carbon content).

0.01% tin increases tensile 1000 psi.

The effect of ingot segregation on tensile strength is an important one because analysis variations are present to a certain degree in all heats. The elements which exhibit the greatest variations are carbon, phosphorus, and sulphur.

Field of Powder Metallurgy Outlined, Is Rapidly Expanding

Reported by David F. Carter
Asst. Met., Diamond Chain & Mfg. Co.

Indianapolis Chapter—Roland P. Koehring of the Moraine Products Division of General Motors was the main speaker on Nov. 17. His topic was "Powder Metallurgy—Ferrous and Non-Ferrous Applications".

The main theme of Mr. Koehring's talk was that powder metallurgy is not a cure-all or a substitute for the regular metal products. It has its own field and this field is being expanded as rapidly as the products prove themselves.

The molding of articles from powders is limited to fairly simple shapes or cylinders since the powders do not flow easily enough to fill recesses in the forming dies. When more intricate shapes are desired their design is reproduced as nearly as possible in a blank which is then ground or machined to the final more intricate shape.

Simple gears may be formed in one operation with only a sizing operation necessary after sintering. By careful die design, it is possible to hold diameter and tooth contour tolerances to close enough limits that no further sizing is necessary.

In the case of oil pump gears it is only necessary to machine for close end length tolerance and bore the hole concentric with the pitch diameter.

During manufacture, parts are strong enough after pressing so that they will withstand a certain amount of handling before sintering. After sintering, parts are quite strong, showing tensile strengths up to 30,000 psi.

The advantages to be gained from the use of parts produced by powder metallurgy are their ability to absorb oil for better lubrication of bearings and other rubbing surfaces, ease of manufacture of suitable shapes in large quantities, elimination of machining operations, and good strength characteristics.

Low Expansion Alloys Described as an Interesting Example of Industrial Research

Reported by Walter G. Patton
Climax Molybdenum Laboratory

Detroit Chapter—An interesting example of industrial research was outlined for the benefit of members at the November meeting when Walter E. Kingston, chief metallurgist of the Radio Tube Division, Hygrade Sylvania Corp., addressed more than 200 members on the subject, "Low Expansion Alloys".

Low expansion alloys used in radio tubes and incandescent lamps carry restrictions as to choice of materials which are formidable indeed.

The first—and perhaps most important qualification, according to the speaker—is that the coefficient of expansion of the alloy used for the lead-in wires of a radio tube must match precisely that of the standard lead glass used in the tube, otherwise glass seals will leak causing premature tube failure. This restriction as to coefficient of expansion holds throughout the entire range of −50 to 450° C.

There are other important requirements such as elevated temperature characteristics, weldability, absence of phase transformation, uniformity of the metal when produced commercially and, last but not least, first cost.

When Hygrade Sylvania first began its search for new materials a high chromium, balance iron alloy was the best metal available for use in diameters over 0.030 in., but this required a special lead glass.

Starting from this point and searching through the literature, testing hundreds of alloy combinations, Hygrade Sylvania eventually developed a 42% nickel, 6% chromium, aluminum alloy that not only meets the service requirements but is capable of being made commercially in tremendous quantities.

An important problem encountered in connection with the use of these low expansion alloys is the formation of a suitable oxide on the wire. A definite oxide formation is necessary in order to obtain a proper bond for glass seals; where the oxide layer is too loose, satisfactory glass-to-metal seals cannot be made. The presence of sufficient chromium content appears to favor the formation of a satisfactory oxide for glass seals, the speaker said.

The coffee talk was given by Captain Donald Leonard of the Michigan State Police who recently spent two months in England as an observer for the Office of Civilian Defense. Captain Leonard left little doubt as to the magnitude of the job of stopping Hitler.

Stoughton Outlines OPM Activities in Metal Field

Reported by James C. Erickson
Assistant Metallurgist, Deere & Co.

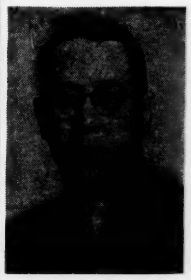
Tri-City Chapter—"Metallurgy, Metallurgists, and Defense," was the title of the address given by Bradley Stoughton, national president of the A.S.M., at the Nov. 11th meeting held in Rock Island, Illinois.

Before the address, many in the audience had failed to realize the range of efforts their government is making to insure them a ready supply of metals during the emergency. But, even before Mr. Stoughton finished his address, all of them had a better understanding of the OPM activities relating to metals.

The main address of the evening was preceded by a coffee talk entitled "What's New," given by John D. Graham, Farmall Works, International Harvester Co. Mr. Graham had spent the week previous at the National Metal Congress and Exposition in Philadelphia, and his talk was a description of what he had seen and heard.

HERE AND THERE WITH A.S.M. MEMBERS

O. V. Greene, assistant metallurgist of the Carpenter Steel Co., has been named manager of tool steel sales for that company.



O. V. Greene

Mr. Greene has been associated with Carpenter Steel since 1928. Prior to that he was metallurgist with the Reading Railroad Co. He is a native of New York State and received his degree of metallurgical engineer from Lehigh University.

Mr. Greene has long been known to A.S.M. members as the author and co-author of numerous convention and TRANSACTIONS papers on such subjects as cold treatment of steels, torsion impact, hardenability, and stress in heat treating. He is also a member of S.A.E. and Sigma Xi, honorary scientific society.

HARRY D. BUBB of Thompson Products, Inc., has been promoted to the post of director of engineering for the company's Cleveland plant and the new $13,000,000 Euclid factory of the concern's subsidiary, the Thompson Aircraft Products Co.

Formerly chief engineer of the Cleveland Thompson plant, he will now be in direct charge of the Thompson metallurgical and chemical laboratories.

Mr. Bubb joined Thompson Products, Inc., after being graduated from Case School of Applied Science in 1925. He was named chief metallurgist in 1929 and chief engineer five years later.

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NEW YORK CHAPTER announces the election of ALEXANDER GOBUS of Lucius Pitkin, Inc., to the vice-chairmanship, to succeed the late HUGH MENIHAN. The two vacancies in the executive committee have been filled by HAROLD M. MALM of the Callite Tungsten Corp. and GEORGE W. STRAHAN of the International Nickel Co.

Industrial Motion Pictures Available for Chapter Use

Six industrial motion pictures covering various aspects of steel manufacture are available from the Bethlehem Steel Co. for use of A.S.M. chapters whose members are engaged in national defense work.

Each motion picture is a sound film and requires 45 min. to show. There is no charge for their use except cost of shipment and return.

Films should be requested at least two or three weeks in advance and for a definite date. Inquiries should be addressed to John C. Long, manager of publications, Bethlehem Steel Co., Bethlehem, Pa.

Titles of the films are: "Sinews of Steel", "Streamlined Steel", "The Making of Alloy Steel", "Wire", "Building the Golden Gate Bridge", and "The Manufacture of Structural Steel Shapes".

Employment Bureau

Address answers care of A. S. M., 7301 Euclid Ave., Cleveland, unless otherwise stated.

Positions Open

HIGH SPEED STEEL METALLURGIST: To take charge of heat treating department of rapidly expanding small tool manufacturer. Steady business now employing about 300 offers exceptional opportunities. Metallurgist must be capable of directing research work in hardening small high speed tools. Age preferably 25 to 35. Starting salary $4000 and bonus. Location middle west. Box 12-5.

MANUFACTURER'S REPRESENTATIVE: For electric heat treating furnaces. To handle sales on protected territory basis for eastern Pennsylvania, southern New Jersey and Maryland. State qualifications and lines now handled. Box 12-10.

Positions Wanted

CHEMIST AND METALLURGIST: Young, married, American. College metallurgical training, including industrial X-rays. Seven years experience as chemist and assistant metallurgist; one year as methods investigator in cast iron, malleable iron, non-ferrous foundry, heat treating, sand control, and manufacturing. Eastern location preferred. Box 12-15.

ENGINEER: Non-ferrous metals. Experience in general sales correspondence, outside contact work in an advisory capacity, inspection of metals. Thorough knowledge of terminology and pricing of aluminum, also in planning and scheduling of orders. Box 12-20.

CHEMIST AND METALLURGIST: Age 49, family. B.S., University of Michigan, 1914, 27 years experience as chief chemist, chief metallurgist and technical research manager in rolling mill, machine tool, automotive, aircraft and office equipment industries. Box 10-25.

METALLURGIST-HEAT TREATER: Desires supervisory position with heat treating department of large concern. Six years practical experience in governmental, commercial and industrial plants. Experienced in heat treatment of ferrous and non-ferrous metals, including aircraft work. Available immediately. Location immaterial. Excellent references. Box 12-25.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Jan. 9	Mass. Inst. of Tech.	Zay Jeffries	Sauveur Night
British Columbia	Jan. 12	Brock Memorial Bldg.	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Buffalo	Jan. 8	Hotel Buffalo	R. A. Lincoln	Stainless Steels for Aircraft
Calumet	Jan. 20	Woodmar Country Club, Hammond		Executives Night
Calumet	Jan. 31			Dinner Dance
Canton-Mass.	Jan. 15	....	H. C. Richardson	Ancient Iron and Steel
Chicago	Jan. 8	Chicago Bar Assoc.	Bradley Stoughton	National President's Night
Cleveland	Jan. 5	Cleveland Club	J. B. Shelby	Heat Resisting Metals
Columbus	Jan. 6	Battelle Institute	Representative of Sterling Foundry Co.	Bearings
Dayton	Jan. 14	Engineers Club	F. J. Dost	Bearings
Detroit	Jan. 12		John Sheppard	Heat Treatment of Ordnance Parts, Shells, Etc.
Golden Gate	Jan. 16		Bradley Stoughton	Metallurgy and Its Relation to National Defense
Hartford	Jan. 13	Hartford Gas Co.	H. E. Somes	Induction Hardening
Indianapolis	Jan. 19	Washington Hotel	Charles D. Harmon	Forging Equipment and Methods
Lehigh Valley	Jan. 2	Hotel Traylor, Allentown, Pa.		Aluminum (Joint Meeting with A.I.M.E.)
Los Angeles	Jan. 22	Scully's Cafe	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Milwaukee	Jan. 6	Athletic Club	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Montreal	Jan. 5	Windsor Hotel	P. M. Haenni	Light Alloys in Modern Warfare
New Haven	Jan. 15	Conn. Light & Power Co.	W. B. Scott	Modern Bronzes
New York	Jan. 12	Bldg. Trades Employers Assoc. Club Rooms.	Commander Guy Chadwick	Naval Vessel Construction and Its Metallurgy
North West	Jan. 9	Coffman Memorial Union, Univ. of Minn.	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Notre Dame	Jan. 7	Engineering Audit., Univ. of Notre Dame.	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Ontario	Jan. 9	Hamilton	Charles W. Briggs	Welding of Steel Castings
Oregon	Jan. 14	Portland	Bradley Stoughton	Metallurgy and Its Relation to National Defense
Peoria	Jan. 5		Bradley Stoughton	Metallurgy and Its Relation to National Defense
Philadelphia	Jan. 30	Engineers Club	A. Allan Bates	Metals Vs. Plastics
Pittsburgh	Jan. 8	Roosevelt Hotel	W. E. Benninghoff	Induction Heating and Hardening
Puget Sound	Jan. 13		Bradley Stoughton	Metallurgy and Its Relation to National Defense
Rochester	Jan. 14	Lower Strong Aud., U. of R.	W. H. Wills	Molybdenum High Speed Steels
Rockford	Jan. 28	Elks' Club	L. R. Foote	Fuels
Rocky Mtn.	Jan. 16	Oxford Hotel	Tom C. Muff	Cast Iron Specifications
Saginaw Valley Group	Jan. 20	Durant Hotel, Flint.	A. T. Colwell	Behind the Scenes in National Defense Engineering
Schenectady	Jan. 13	Union College	David Harker	The Electron Microscope
Southern Tier	Jan. 26		Bradley Stoughton	Metallurgy and Its Relation to National Defense
St. Louis	Jan. 16	Mineral Springs Hotel, Alton, Ill.	Albert Vigne	Non-Ferrous Metallurgy
Syracuse	Jan. 6	Onondaga Hotel	F. F. Lucas	High Power Metallography
Texas	Jan. 23		Bradley Stoughton	Metallurgy and Its Relation to National Defense
Tri-City	Jan. 13	Hotel Ft. Armstrong, Rock Island, Ill.	J. C. Menzies	Hard Facing in General Shop Work
Worcester	Jan. 7		R. J. Rutherford	City Gas Manufacture and Distribution
York	Jan. 14	Manufacturers' Association Bldg.	Frederick O. Hess	Development and Use of Radiant Burners in Furnace Design

A.S.M. War Products Committees Formed

(Continued from page 1)

lon Chapter. This group already had a working committee functioning along similar lines and it was only necessary to enlarge its personnel and broaden its activities. The membership of the Canton-Massillon A.S.M. War Products Advisory Committee, and the field each member will cover as a technical consultant, are as follows:

E. S. Rowland, Timken Steel & Tube Co. (Testing and Specifications), chairman.

L. A. Zeitz, East Ohio Gas Co. (Fuels and Public Relations).

Charles A. Stroup, American Steel Foundries (Steel Castings).

Paul Snyder, Climax Molybdenum Co. (Heat Treatment and Tool Steels).

E. R. Hamilton, Frease & Bishop (Patents).

E. C. Roglin, Hoover Co. (Non-Ferrous).

Hubert A. Grove, Republic Steel Corp. (Armor Plate).

E. R. Johnson, Republic Steel Corp. (Process Metallurgy).

Robert M. Wallace, Griscom-Russell Co. (Welding).

F. L. Cavender, Canton Drop Forging Co. (Forgings).

Ervin S. Bower, Republic Steel Corp. (Ordnance and Inspection).

H. E. McKimmey, Carnegie-Illinois Steel Corp. (Cast Iron).

The formation and membership of other chapter A.S.M. War Products Advisory Committees will be announced in the January issue of THE REVIEW or as soon as they are organized and the information is received at headquarters.

The universal acceptance by the chapters of this opportunity for definite, constructive and helpful participation in the present crisis is indicative of the desire of all chapters and members of the American Society for Metals to make a definite contribution to eventual Victory.

Woodside at New Haven

Reported by F. N. Meyer
Technical Supervisor, American Brass Co.

New Haven Chapter — The second meeting of the season was held on Nov. 26 with F. Lloyd Woodside of the Climax Molybdenum Co. as speaker.

Preceding Mr. Woodside's address, those in attendance observed a period of silence in honor of the late Hugh Scallen and Charles Sanford. Mr. Woodside's address on "Heat Treatment of Molybdenum High Speed Steels" has been reported in previous issues of THE REVIEW.

High Speed Motion Pictures Analyze Machining Operations Too Fast For Eye

Reported by Robert Clayton
Metallurgist, American Locomotive Co.

Schenectady Chapter—Capt. E. M. Watson, Watervliet Arsenal, on leave of absence from the General Electric Co., spoke on "High Speed Motion Pictures of Machining Operations" at the October meeting.

Captain Watson explained the technique of high speed photography and then showed some pictures. This method provides the means to analyze motions too rapid for the unaided eye.

Movies of planning operations with sides of the work pieces nearest the camera previously marked in $\frac{1}{32}$-in. squares showed plainly the distortion of the various metals immediately preceding the cutting tool. This also permitted the extent of change in shape of the metal due to forming the chip to be estimated. The intimate views ¼ in. in diameter showed the nonferrous material to have characteristic plastic deformation, steel to have easy machinability, and cast iron to come off in chunks.

Pictures of a punch press in action showed the punch to stop at the work piece while pressure to cut was being built up.

The "chattering" of a milling machine cutting steel, cast iron and brass was graphically illustrated with 1-sq. in. views showing the entire width of cuts and close-up shots showing ¼-in. square areas at the points where maximum thicknesses of stock were removed.

Some idea of the time factor involved may be gathered from the fact that it took approximately an hour to show pictures actually taken in 1 min.

This interesting lecture was concluded by the showing of stroboscopic movies taken at M.I.T. of humming birds in flight, soap bubbles bursting, and the remarkable behavior of falling drops of milk.

British Aircraft Forging Practice Detailed for Clevelanders by Milnes

Reported by Gerald M. Cover
Assoc. Prof. of Met., Case School of Applied Science

Cleveland Chapter—At the monthly dinner meeting held Oct. 6 at the Cleveland Club the coffee talker was Dr. Brooks Emeny, director of Foreign Affairs Council, Cleveland College, who spoke on "National Defense and Foreign Policy".

The regular meeting was addressed by A. H. Milnes, metallurgist, representative of the Bristol Aeroplane Co., Ltd., on the subject of "The Metallurgical Aspect of Drop Forgings in Aircraft Production".

The requirements of the drop forging industry are stringent and inspection has increased the problems of the electric furnace steel maker. The basic fundamental of a good drop forging is a sound ingot. In England big-end-up ingots with hot tops are used.

British rolling practice is to give more passes with less reduction per pass. Tests include micro and macro examination, physicals, chemicals, magnaflux and grain size.

The advantages of fine-grained steels are many, such as less danger of cooling cracks due to less depth of hardening. Coarse-grained steels forge more easily but fine-grained steels are generally to be preferred.

The speaker's opinion is that flakes in forgings are due to too rapid cooling after rolling and that hydrogen is a contributing factor only.

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